DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status and Critical Habitat for the Desert Pupfish

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Service determines the desert pupfish (*Cyprinodon macularius*) to be an endangered species. Critical habitat is also designated for this species in Imperial County, California, and Pima County, Arizona. Viable, self-

sustaining populations of desert pupfish are now believed to exist in only two of the historic habitats in the United States. The remaining populations in Mexico are also reported to be declining or vulnerable. The surviving natural populations are impacted by competition from exotic fishes for food and space, predation by exotic fishes, water pollution, ground-water pumping, agricultural pesticide drift, stream channelization, and possibly the habitat modifications associated with flooding in the Colorado River delta in 1983 and 1984. Designation of the desert pupfish as an endangered species affords this species the full protection provided by the Endangered Species Act of 1973, as amended.

DATE: The effective date of this rule is April 30, 1986.

ADDRESS: The complete file for this rule is available for inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Lloyd 500 Building, Suite 1692, 500 NE., Multnomah Street, Portland, Oregon 97232.

FOR FURTHER INFORMATION CONTACT: Mr. Wayne S. White, Chief, Division of Endangered Species, at the above address, (503/231–6131 or FTS 429–6131).

SUPPLEMENTARY INFORMATION:

Background

The desert pupfish (*Cyprinodon macularius*) is a small, laterally-compressed fish with a smoothly rounded body shape. Adult fish rarely grow larger than 75 millimeters (3 inches) in total length. Males are larger than females and during the reproductive season become brightly colored with blue on the dorsal portion of the head and sides and yellow on the caudal fin and the posterior part of the caudal peduncle. Females and juveniles typically have tan to olive backs and silvery sides. Most adults have narrow, vertical, dark bars on their sides, which are often interrupted to give the impression of a disjunct, lateral band. The desert pupfish was described in 1853 by Baird and Girard from specimens collected in the San Pedro River of Arizona.

The desert pupfish was once common in the desert springs, marshes, and tributary streams of the lower Gila and Colorado River drainages in Arizona, California, and Mexico. It also formerly occurred in the slow-moving reaches of some large rivers, including the Colorado, Gila, San Pedro, and Santa Cruz. The species is currently known from only two historic locations in the United States. In California, it still exists in two Salton Sea tributaries (San Felipe Creek system and its associated wetland San Sebastian Marsh, Imperial County, and Salt Creek, Riverside County) and a few shoreline pools and irrigation drains along the Salton Sea in Imperial and Riverside Counties. In Arizona, it still inhabits Quitobaquito Spring within the Organ Pipe Cactus National Monument in Pima County. The species is also believed to inhabit the Colorado River system in the Rio Sonoyta drainage and Santa Clara Slough in Sonora, Mexico. Recent surveys of Salt Creek and the irrigation drains around the Salton Sea (Moore, 1983) and the Rio Sonoyta (McMahon and Miller, 1985) indicate that the populations there may now be reduced to such low levels that they are no longer viable. The current status of the population in Santa Clara Slough is unknown. However, the floods that inundated vast reaches of the Colorado River delta in 1983 and 1984 may have given tilapia (*Tilapia zillii*), largemouth bass (*Micropterus salmoides*), and other exotic fishes that compete with, or prey upon, the desert pupfish, access to this slough. These recent high flows also may have enhanced habitat conditions for exotic fishes by improving water quality in the delta.

Refugia populations of desert pupfish have been established in Arizona at Bog Hole (Santa Cruz County), Research Ranch (Santa Cruz County), Arizona-Sonora Desert Museum (Pima County), Boyce Thompson Arboretum (Pinal County), and Arizona State University (Maricopa County). The Bog Hole and Research Ranch populations are believed to be derived from Quitobaquito Spring. The fish at Arizona-Sonora Desert Museum and Boyce Thompson Arboretum were obtained from Dexter National Fish Hatchery, which obtained its fish from the Santa Clara Slough population. Two populations have been established in refugia at Arizona State University, one derived from Quitobaquito Spring and the other from Santa Clara Slough.

In California, refugia populations exist at Salton Sea State Park (Riverside County), the Living Desert Reserve (Riverside County), and three separate locations in Anza-Borrego State Park (San Diego County). The populations in Salton Sea State Park and the Living Desert Reserve are derived from Salton Sea Stock. Two of the refugia populations at Anza-Borrego State Park (Palm Spring and the Visitor Center) are derived from the Salton Sea; the third (Palm Canyon) is derived from San Felipe Creek. Most of these refugia populations are maintained in highly artificial environments, and contain relatively small numbers of fish.

Desert pupfish are also being held at Dexter National Fish Hatchery, Dexter, New Mexico. These fish were obtained from Santa Clara Slough. They are being maintained in that facility for use in research and for future reintroduction efforts in Arizona.

Desert pupfish were recently introduced into one natural and two manmade spring habitats on Bureau of Land Management (BLM) land in Arizona. These populations, which were established from the stock at Dexter National Fish Hatchery, are located at Peoples Canyon in the Bill Williams River drainage (Yavapai County), Howard Well in the Gila River drainage (Graham County), and Mesquite Spring in the Gila River drainage (Pinal County). However, it will be some time before it is known whether these introductions have resulted in the establishment of self-sustaining populations that can survive the local climatic regime.

Land ownership of the remnant natural habitats in the United States is divided between private and Federal interests. Quitobaquito Spring is entirely on National Park Service Lands within the boundaries of Organ Pipe Cactus National Mounment. Title to the lands along San Felipe Creek is arranged in a checkerboard pattern, about evenly divided between Federal and private holdings.

Desert pupfish are adapted to harsh desert environments and are capable of surviving extreme environmental conditions. They have been reported to survive water temperatures in excess of 43.3 Centigrade (110 Fahrenheit) (Moyle, 1976), oxygen levels as low as 0.1 to 0.4 parts per million (Lowe *et al.*, 1967), and salinities nearly twice that of seawater (Barlow, 1958). They are also capable of surviving extreme fluctuations in temperature (Lowe and Heath, 1969) and daily salinity changes of as much as 10 to 15 parts per thousand (Kinne, 1960). Although desert pupfish are extremely hardy in many respects, they cannot tolerate competition or predation and are thus readily displaced by exotic fishes.

Desert pupfish mature rapidly and may produce up to three generations per year. Spawning males typically defend a small spawning and feeding territory in shallow water. The eggs are usually laid and fertilized on a flocculent substrate and hatch within a few days. After a few hours, the young begin to feed on small plants and animals. Spawning occurs throughout the spring and summer months. Individuals typically survive for about a year.

These characteristics, along with the adaptability of the desert pupfish to laboratory aquaria, make it a valuable research animal for ichthyologists and

other biologists. A great deal has been learned from this species about fish ecology, genetics, behavior, and physiology. In addition, the rapidity with which the desert pupfish and other members of the genus *Cyprinodon* differentiated into distinct species may give scientists valuable insights into the process of speciation.

The precarious status of the desert pupfish is recognized by the State of California, which has classified the desert pupfish as an "endangered" species, and by the State of Arizona, which has included the desert pupfish on its list of native species that are in danger of being extirpated from the State. The desert pupfish was included in the Service's December 30, 1982, Review of Vertebrate Wildlife for Listing as Endangered or Threatened Species (47 FR 58454). In that review, the desert pupfish was classified as a category 1 species, indicating that the Service had substantial information on hand to support a proposed rule to list the species as endangered or threatened. On April 12, 1983, the Service was petitioned by the Desert Fishes Council to list the desert pupfish. The Service published a notice of finding on June 14, 1983 (48 FR 27273), announcing that the petition had presented substantial information indicating that listing may be warranted. On May 16, 1984, the Service published a proposed rule to list the desert pupfish as an endangered species and declare critical habitat (49 FR 20739), in accordance with Section 4(b)(3)(B)(ii) of the Endangered Species Act of 1973, as amended.

Summary of Comments and Recommendations

In the May 16, 1984, proposed rule (49 FR 20739) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, foreign governments, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices were published in the *Arizona Republic*, the *Tucson Citizen*, and *Ajo Copper News* on June 13, 1984, and in the *Imperial Valley Press* on June 15, 1984, which invited general public comment. The Service received written comments from 28 interested parties in response to these notifications and newspaper notices. These comments are grouped together by subject matter and are discussed below, together with the Service's response. Four of the commentors expressed support for the proposed rule, and one commentor submitted recommendations for protecting critical habitat without expressing support or opposition.

Comments were received from the Arizona Game and Fish Department (AGFD), Bureau of Land Management (BLM) and Arizona-New Mexico Chapter of the American Fisheries Society (AFS) expressing support for listing the desert pupfish as endangered but recommending that introduced populations in all or parts of Arizona be excluded. The Service replies that the reintroductions already conducted and those proposed in Arizona are essential for recovery of this species. The Service does not believe this rule is the appropriate mechanism for excluding such populations from the protection afforded by the Endangered Species Act. When the Act was reauthorized in 1982, it was amended to authorize the Secretary to designate introduced populations, including those introduced before a species is listed, as experimental, if circumstances warrant such designation. Populations that are determined to be experimental, and not essential to the survival of the species, pursuant to section 10(j) of the Act are exempt from the formal consultation requirements prescribed in section 7. The 1982 Amendments to the Act also provide greater flexibility with respect to the taking of endangered species from experimental populations. Section 9 of the Act generally prohibits the taking of endangered species of fish and wildlife. However, experimental populations are treated as threatened species even though the donor populations from which they are derived are listed as endangered. If an introduced population is determind to be experimental, and thereby threatened for the purposes of Section 9, the Secretary may impose less restrictive prohibitions on the take of animals from that population pursuant to section 4(d) of the Act. In view of the increased flexibility provided by the 1982 Amendments relative to experimental populations, the Service believes that the appropriate mechanism for responding to the concerns expressed by BLM, AGFD, and AFS regarding the proposed introductions is through a separate rulemaking conducted pursuant to section 10(j).

AGFD and AFS also recommended that the final rule identify the status of introduced populations throughout the desert pupfish's historic range. AFS further recommended that a survey be conducted in Santa Clara Slough to assess the impact that the recent high flows in the Colorado River delta have had on that habitat. The Service replies that the current status of all known introduced and refugia population desert pupfish is discussed in the background section. Continued monitoring of the desert pupfish a habitat, including Santa Clara Slo will be part of the recovery effort.

BLM noted that the proposal fa recognize that BLM has designate area around San Sebastian Marsh Imperial County, California, as ar of Critical Environmental Concer (ACEC), and that BLM and other agencies are involved in cooperat efforts to acquire private inholdin within that ACEC. The Service acknowledges that BLM and othe agencies are cooperating in effort secure the integrity of the critical habitat, and appreciates such effo

AGFD, BLM, and AFS expresse concern about a lack of interagen coordination during the developm the proposed rule. The Service acknowledges that some misunderstandings occurred as a of differing interpretations of dec reached at a 1981 meeting attend representatives of all affected ag Measures have been taken to ins adequate coordination occurs on future actions involving the dese pupfish.

One letter of support for the rulemaking, as proposed for Calif populations, was received from t Western Regional Office (WRO) National Park Service (NPS). Ho support was withheld for the listi designation of critical habitat at Quitobaquito Spring, Arizona, pe the completion of ongoing studie WRO expressed concern that list desert pupfish would mandate si species management actions for area, thus precluding research ar management activities that are n to maintain other native species Monument. The WRO noted that to Quitobaquito Spring include p drift from new agricultural uses i Mexico and groundwater pumpir could conceivably eliminate spri to that entire ecosystem. The Ser responds that it is not appropriat exclude the population at Quitob Spring from the application of th rule. That determination is basec threats to the habitat that are cit the proposed rule and that are re by the WRO in its comments on proposal. Section 4(b)(1) of the Endangered Species Act specifie determinations to list a species s based solely on the best scientifi commercial data available regar status of a species. Pursuant to s 4(b)(2) of the Act, the Service m exclude an area from critical hal

the benefits of such exclusion outweigh the benefits of inclusion, unless the failure to designate the area will result in extinction of the species. The NPS, however, did not provide any information or data to indicate that the benefits of excluding Quitobaquito Spring and its riparian area outweigh the benefits of its inclusion as critical habitat. The Service recognizes that the NPS has a responsibility to conserve other native species that occur at Quitobaquito Spring, but considers that listing the desert pupfish and designating its critical habitat are compatible with NPS conservation responsibilities.

Comments were received from four user groups expressing concern or opposition to the proposed rule. Two of these, the Coachella Valley Water District (CVWD) and Imperial Irrigation District (IID) shared several concerns and doubted that the desert pupfish qualifies for listing under the Endangered Species Act. The two districts contended that the range of the desert pupfish and the amount of available habitat is greater today than it was prior to the formation of the Salton Sea in 1905. They also contended that the construction of agricultural drains around the Salton Sea and the establishment of refugia at Anza-Borrego State Park and other locations have increased the amount of desert pupfish habitat over what was available historically. On this basis, they asserted that the range and habitat of the desert pupfish is not in danger of destruction, significant modification, or curtailment. The Service responds that the decline in the distribution and abundance of the desert pupfish is well documented in the proposed rule. The Service rejects contentions by the two districts that the distribution of the desert pupfish is greater today than prior to 1905 because of the formation of the Salton Sea. Although the desert pupfish was once abundant in the Salton Sea and its tributaries, this species has now been extirpated from all but one of its historic habitats in Arizona, from all but one of its historic habitats in California, and from all but one or two of its historic habitats in Mexico.

CVWD and IID noted that no information is presented in the proposed rule to indicate that the desert pupfish is overutilized for commercial, recreational, scientific, or educational purposes. The Service responds that overutilization for commercial, recreational, scientific, or educational purposes is not a significant current threat to the survival of the desert pupfish.

CVWD and IID questioned the validity of the sampling techniques and methodology used to estimate desert pupfish numbers in and around the Salton Sea, and they viewed as spurious those reports in the literature that indicate a decline in desert pupfish abundance since 1960. They projected that the Salton Sea would contain 239,000 pupfish if the population density is only one desert pupfish per acre. On this basis, they contended that the threats related to predation and disease are not adequately documented, and therefore, listing of the desert pupfish as endangered is not justified. The Service responds that the sampling techniques used to document the decline of desert pupfish in the Salton Sea and its tributaries are scientifically valid. All of the published data indicate that desert pupfish numbers in the Salton Sea have declined drastically in the last 20 to 30 years. The two districts did not present any data to support their projection that the Salton Sea may have a population of 239,000 desert pupfish. For that projection to be valid, desert pupfish would have to be uniformly distributed throughout the Sea and have an average population density of a least one desert pupfish per acre. The Service does not accept the validity of either assumption. Historical observations indicate that the desert pupfish was never very common in the open waters of the Salton Sea, and recent collection records show the desert pupfish to be extremely rare or absent from the inshore areas. In 1983, the California Department of Fish and Game (CDFG) surveyed a variety of Salton Sea habitats. Its surveys involved over 13,000 trap-hours and yielded only six desert pupfish. These six fish represented less than 0.1% of the total number of all fish collected. The Service believes these survey data, in conjunction with the results summarized by Black (1980), McMahon and Miller (1985), Miller (1943), Miller (1961), and Schoenherr (1980) provide adequate documentation to support a finding that the desert pupfish population has declined and that the species is endangered.

Both CVWD and IID commented that existing land uses within Organ Pipe Cactus National Monument are controlled to insure protection of the desert pupfish at that site. They also stated that BLM and NPS have designated desert pupfish habitats as protected and manage them accordingly. They noted that the State of California has placed the desert pupfish on its endangered species list. On this basis, they contended that existing regulatory mechanisms are adequate to insure the continued existence of the desert pupfish. The Service responds that some protective actions have been taken by State and Federal agencies to help prevent the extinction of the desert pupfish. However, the Service does not believe these actions are sufficient to insure the species' continued existence. This determination is supported by the comments of the Resources Secretary of the State of California, who noted that, subsequent to State listing, CDFG has requested emergency Federal listing of this critically endangered fish on three occasions.

CVWD and IID also contended that other natural or manmade factors do not support a finding that the desert pupfish is endangered. They commented that *Hydrilla* is not currently present in desert pupfish habitat, and therefore, no scientific basis exists for believing this plant is a threat to this species. They further commented that the Service failed to provide any scientific evidence that pesticides are significantly reducing the pupfish population or that a major pesticide spill is probable. The Service agrees that *Hydrilla* is not present in desert pupfish habitat, but the Service disagrees with the conclusion that it is not a potential threat. *Hydrilla* has invaded many aquatic habitats and the distinct possibility exists that it could become established in the fish's habitat. If this plant does invade the ecosystem, extreme control methods (mechanical, chemical, and biological) will likely be recommended. As an example, CVWD has proposed using grass carp to control aquatic weed growth in the Imperial and Coachella Valleys. If *Hydrialla* becomes established in the irrigation drains and canals around the Salton Sea and grass carp are used as a control, the carp may compete for food and space with the desert pupfish. With respect to the contention that pesticide drift is not a problem, the Service notes that the National Park Service's comments on the proposed rule also indicate that pesticide drift from Mexico is a significant potential threat to the population in Quitobaquito Spring.

The CVWD and IID commented that section 4(b) of the Endangered Species Act requires the Secretary to take into consideration the efforts being made by any State, or any political subdivision of a State, to protect a species. They stated that the State of California has placed the desert pupfish on its endangered species list and that this action provides prohibitions against taking the fish without a permit. They noted that CDFG has been working with the Federal Government to establish an Area of Environmental Concern and an

Outstanding Natural Area in the San Felipe Creek watershed to protect the desert pupfish. They noted that desert pupfish have been established in refugia at Anza-Borrego State Park and other locations. They also noted that Riverside, San Diego, and Imperial Counties are required, under the California Environmental Quality Act, to mitigate impacts related to development that might adversely affect the desert pupfish. They concluded that because of these conservation actions, the desert pupfish is not in danger of extinction throughout all or a significant portion of its range, and, therefore, it does not need to be listed as endangered. After consulting with the affected States, the Service has determined that existing conservation efforts are not adequate to insure the continued existence of the desert pupfish. That determination is based on the comments submitted by State Officials from Arizona and California, which are summarized herein.

IID, CVWD, and the two other water user groups, Imperial Dam Advisory Board (IDAB), and Yuma County Water User's Association (YCWUA), expressed concern that listing the desert pupfish would adversely affect operation and maintenance activities associated with irrigation. In addition, YCWUA contended that the maintenance work performed by water related agencies has been beneficial to the desert pupfish because the amount of usable fish habitat has been increased by the periodic removal of aquatic vegetation; hence, the desert pupfish should not be listed as endangered. IID requested that all maintained systems currently used for irrigation or the diversion of runoff or flood waters be excluded from the application of the final rule. The Service responds that the dredging activities carried out by water districts to maintain the irrigation drains and canals around the Salton Sea have not been a significant factor in the recent decline of the desert pupfish. Prior to the invasion of tilapia and sailfin mollies into these habitats, desert pupfish were present in large numbers and survived the districts' periodic dredging operations without apparent ill effect. Even though desert pupfish are now truly scarce or entirely absent from these habitats, the Service recognizes that there is still some potential for incidental take to occur in the course of the districts' normal maintenance operations. However, the Service has determined that it does not have the authority under the Endangered Species Act to exclude the districts' irrigation drains and canals from the application of the final rule. That determination is based on section (4)(b)(1) of the Act, which specifies that determinations to list a species shall be based solely on the best scientific and commercial data available. The Service notes, however, that incidental take of an endangered species may be authorized pursuant to section 7 or section 10(a) of the Endangered Species Act.

CVWD requested that the listing process be extended for six months to allow time for additional data to be obtained. The Service replies that it does not believe that substantial information has been presented to show that CDFG's collection data are either insufficient or inaccurate.

A letter of support was received from the Organ Pipe Cactus National Monument. In addition, it recommended expanding the critical habitat to be designated at Quitobaquito Spring to include a buffer zone. The Service considers the proposed critical habitat to be sufficient to delineate the areas essential to the conservation of the desert pupfish. If future surveys indicate the existence of additional areas warranting designation as critical habitat, the Service will consider making such a designation.

Three California State agencies expressed support for listing the desert pupfish as endangered. The Secretary of the State of California commented that he and Governor Deukmejian fully support including *Cyprinodon macularius* on the Federal list of endangered species, and endorse the designation of critical habitat as proposed. The CDFG supported listing the desert pupfish as endangered and concurred with the proposed critical habitat. CDFG also noted that it had asked the Service to list this species on an emergency basis on three separate occasions. The California Department of Parks and Recreation suggested that Salt Creek in Imperial County should be added as critical habitat, and that the critical habitat in the San Felipe Creek drainage should be expanded to provide a buffer zone large enough to protect the hydrologic features that sustain perennial flows in San Felipe Creek and San Sebastian Marsh. The Service responds that it has decided to retain critical habitat as described in the proposed rule. That determination is based on the information and recommendations submitted by CDFG. If future surveys document the occurrence of viable populations of desert pupfish in other habitats or demonstrate that protection of the designated critical habitat along San Felipe Creek is not adequate for the conservation of the population there, th Service will consider revising the critica habitat.

Two county agencies in California, th Riverside County Parks Department an the Riverside County Planning Department, submitted comments supporting the proposed rule.

Dr. Robert R. Miller, University of Michigan Museum of Zoology; Dr. Larry C. Oglesby, Pomona College; Dr. Jonathan Baskin, California State Polytechnical University; Dr. Allan Schoenherr, Fullerton College; and Mr. J.A. St. Amand, and Mr. K.E. Moore, CDFG Biologists, provided personal observation data on the decline of pupfish numbers. These biologists also provided additional support for the Service's conclusions on the species, and they provided some views on other potential threats. Specifically, Dr. Oglesby was concerned that the brackish water snail of the family Thiaridae, a recent introduction into the Salton Sea system, could compete with the pupfish for food. Mr. J.A. St. Amand reported that the fish could be threatened by lining of the drains and canals for water conservation and potentially by geothermal development in the Imperial Valley. The Service agrees that these factors could also threaten the continued existence of the desert pupfish.

Dr. Schoenherr also stated that based on his survey results he believes San Felipe Creek contains the only viable California population of the species. Th Service agrees that this may be true but believes more study is required before a final determination can be made.

Three conservation organizations, the Desert Fishes Council (DFC), International Union for Conservation of Nature and Natural Resources (IUCN), and Arizona Wildlife Federation (AWF submitted comments expressing suppor for listing the desert pupfish as endangered and provided additional information or recommendations concerning the proposed rule. DFC and AWF recommended various measures t protect the remaining desert pupfish habitats. IUCN submitted a draft data sheet on the desert pupfish, prepared fo inclusion in the forthcoming IUCN Fish *Red Data Book*, and indicated that the desert pupfish will probably be categorized as endangered in that publication.

Four conservation organizations (Defenders of Wildlife, Desert Tortoise Council, Lower Basin Native Fishes Subcommittee, and Yuma Audubon Society) submitted general comments expressing support for the proposed

rule, but they did not provide any additional information or recommendations concerning the desert pupfish or its habitat.

The Imperial County Planning Department commented that the California Department of Parks and Recreation is considering expansion of the Ocotillo Wells Recreational Area and noted that off-road vehicular use in the San Felipe Creek watershed could adversely affect the critical habitat, but it did not offer an opinion on the rule. The Service agrees that off-road vehicular use may pose a threat.

The Coachella Valley Water District, the Imperial Irrigation District, and the Imperial Dam Advisory Board each requested that a public hearing be held on the proposed rule. On August 13, 1984, the Service published a notice in the **Federal Register** (49 FR 32320) announcing that a public hearing was scheduled to receive public input on this proposal. The hearing was held in Imperial, California, on August 30, 1984. Testimony was presented at this hearing by representatives of four organizations. Two of the representatives spoke in opposition to the proposal, one spoke in support of the proposal, and one spoke in support of expanding critical habitat in the San Felipe Creek watershed, without expressing support or opposition to the proposal as it related to listing the desert pupfish as endangered. A summary of the testimony presented at this hearing is given below along with the Service's response.

The testimony of CVWD and IID was essentially the same as presented in the written comments that were submitted by the two districts regarding the proposed rule. The Service has already responded to these issues. The testimony of the Imperial County Planning Department (ICPD) was also similar to that presented in its written comments on the proposal. In addition, ICPD noted that Imperial County requires a permit for water wells that are drilled in Imperial County and requested the Service to notify ICPD if it becomes aware of attempts to utilize water wells in the vicinity of San Sebastian Marsh. ICPD requested that the critical habitat be expanded to include the area described as critical habitat by Lebo *et al.* (1982). The Service has previously responded to the issue of whether the critical habitat in California should be expanded, and will notify ICPD if it becomes aware of any new well activity in the vicinity of San Sebastian Marsh. The CDFG presented testimony in support of listing the desert pupfish as endangered and responded to several points that were raised by CVWD and IID.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the desert pupfish (*Cyprinodon macularius*) should be classified as an endangered species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations promulgated to implement the listing provisions of the Act (codified at 50 CFR Part 424; revised to accommodate 1982 Amendments—see 49 FR 38900, October 1, 1984) were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the desert pupfish (*Cyprinodon macularius*) are as follows:

(A) *The present or threatened destruction, modification, or curtailment of its habitat or range.* At the beginning of the 20th century, the desert pupfish was widespread throughout the lower Gila River and its tributaries, the San Pedro and Santa Cruz Rivers, and the lower Colorado River in Arizona, California, and Baja California; and Sonora, Mexico. Starting in the 1880's many desert rivers began experiencing major erosional cycles that resulted in the loss of permanent waters in numerous pupfish streams and the drying up of the shallow, littoral areas preferred by this species. Miller (1961) related this increase in erosion to overgrazing. The construction of mainstream dams on the Gila, Colorado, and Salt Rivers for irrigation and flood control dewatered the lower Gila and Salt Rivers and eliminated the marshy sidepools in the Colorado River that were utilized by desert pupfish. After this occurred, the pupfish were forced into the mainstream channels of the remaining permanent streams where they were eaten by predators or outcompeted by native and exotic species.

The desert pupfish is now known to exist only in two locations in the United States, the Salton Sea area and Quitobaquito Spring. The desert pupfish in the Salton Sea area have been severely reduced in numbers and distribution as the result of the introduction of exotic fish species, modifications to the water conveyance facilities used for irrigating and draining agricultural lands, the application of agricultural pesticides, the dewatering of some natural spring habitats by groundwater pumping, and the inundation of other spring habitats by the rising waters of the Salton Sea. These factors, in combination, have reduced pupfish numbers in most habitats to such low levels that long-term survival prospects are poor.

The only known habitat in California in which the desert pupfish make up a dominant part of the fish fauna is a short reach of San Felipe Creek and two small tributaries near San Sebastian Marsh (Black 1980). However, the integrity of this habitat is threatened by proposals to convert the privately owned lands to irrigated agriculture. The removal of large volumes of ground-water from the aquifers that feed San Felipe Creek could cause the marsh to become desiccated and destroy its habitat value for pupfish. Geothermal development is also a potential threat to this habitat. Geothermal lease applications have been filed with the Bureau of Land Management for some tracts in the vicinity of San Sebastian Marsh. If geothermal energy is discovered in this area in commercially marketable quantities, it is likely the privately owned lands around San Sebastian Marsh would be developed with adverse consequences to pupfish habitat. The Federal lands around San Sebastian Marsh have been leased for oil and gas exploration with a no surface occupancy stipulation. Oil and gas development on the adjacent privately owned lands could adversely affect desert pupfish habitat, particularly if there are significant surface disturbances. The Federal lands around Salt Creek have been leased for geothermal development and oil and gas exploration.

The population in Quitobaquito Spring is located downwind from nearby farms in Mexico that are sprayed with organophosphates and chlorinated hydrocarbons. Recent studies of this population (Kynard, 1981) revealed that the fish in Quitobaquito Spring contained detectable levels of both parathion and DDT derivatives in the late 1970's. Because of the extremely restricted range of the desert pupfish, any major accidental spills or increased levels of pesticide drift could have a devastating impact on the entire population in Quitobaquito Spring.

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* A few individuals may occasionally be taken incidentally from the Salton Sea by anglers collecting sailfin mollies (*Poecilia latipinna*) for bait. However, there is no evidence that desert pupfish are currently overutilized for any purpose.

C. *Disease or predation.* Several known predators and competitors of

desert pupfish have become established in the natural and manmade tributaries of the Salton Sea, including tilapia (*Tilapia mossambica* and *Tilapia zillii*), sailfin mollies, shortfin mollies (*Poecilia mexicana*), mosquitofish (*Gambusia affinis*), pothole livebearers (*Poeciliposis gracilis*), and several members of the families Centrarchidae, Ictaluridae, and Cyprinidae. Desert pupfish populations in the Salton Sea area have also been infected by a parasitic copepod (anchor worm) of the family Lernaidae. In Arizona, desert pupfish have been displaced from many of their historic spring habitats by largemouth bass.

Recent studies have shown that juvenile tilapia compete with desert pupfish for many of the same food items, and that adult tilapia prey on fish and fish eggs. Field and laboratory observations have revealed that tilapia also interfere with the reproductive behavior of desert pupfish (Schoenherr, 1980). The extent to which this type of interference has suppressed pupfish reproduction is not known. Largemouth bass are voracious predators that are capable of eliminating pupfish completely from small spring habitats (Miller and Pister, 1971).

D. *The inadequacy of existing regulatory mechanisms.* California State law (The Endangered Species Act of 1970, Chapter 1510, Stats. 1970) prohibits the taking of desert pupfish without a permit. That law was recently amended (Chapter 1240, Stats. 1984) to require State agencies to consult with CDFG on State projects that may affect State listed species. However, few of the activities that pose a threat to the desert pupfish in California are likely to require State agency approval. Hence, California's endangered species law does not provide an adequate regulatory mechanism to protect the remaining desert pupfish habitats. The Service is not aware of any regulatory mechanisms that have been established to protect the surviving Mexican populations and their habitats, or to alleviate the threats to the Quitobaquito Spring population that are associated with aerial pesticide spraying and increased ground-water pumping in Mexico.

E. *Other natural or manmade factors affecting its continued existence.* The exotic aquatic weed, *Hydrilla verticillata*, was recently introduced into the All American Canal. This plant is capable of spreading rapidly and is very difficult to control. Consequently, it is possible that this aquatic weed may soon find its way into habitats that support desert pupfish. It is not known what the direct effect of its establishment would be on desert pupfish. However, the extreme methods of chemical, mechanical, and biological control that have been used in other areas where this plant has become established would be likely to have a detrimental effect upon pupfish habitat.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species in determining to make this rule final. Based on this evaluation, the preferred action is to list the desert pupfish as endangered with critical habitat. The now localized distribution of this fish, competition from exotic species, predation pressure, and continued adverse modifications of habitat (i.e., ground-water pumping, pesticide applications, and changes in water conveyance facilities) indicate it is imminently threatened with extinction. Therefore, endangered classification is warranted.

Critical Habitat

Critical habitat, as defined by Section 3 of the Act means: (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection, and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Section 4(a)(3) of the Act requires that critical habitat be designated to the maximum extent prudent and determinable concurrently with the determination that a species is endangered or threatened. Recent status surveys have been instrumental in assessing essential habitat and the present condition of the desert pupfish. Overcollection is not the primary threat facing the desert pupfish. For these reasons the Service does not believe that determining critical habitat for the desert pupfish will contribute to a further decline in the species; hence, critical habitat is designated by this rule. Critical habitat is being designated for the desert pupfish at Quitobaquito Spring, Organ Pipe Cactus National Monument, Pima County, Arizona, and along portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California. The areas designated as critical habitat include approximately one-half acre of aquatic habitat at Quitobaquito Spring and a 100 foot riparian buffer around the spring, and approximately 11 miles of st channel along San Felipe Creek a of its tributaries and a riparian b zone of 100 feet on both sides of stream channel. A riparian buffe of 100 feet around Quitobaquito and at least 100 feet on each side stream channel are deemed nece because any activities that are c out adjacent to these areas may direct impact on the quality of ac habitat for desert pupfish. Consti elements for all four areas desig critical habitat include clean unp water that is relatively free of ex organisms, especially exotic fish small slow-moving desert stream spring pools with marshy backw areas. The "Regulations Promulg section contains a legal descripti the critical habitat.

The areas being designated as habitat satisfy all known criteria ecological, behavioral, and phys requirements of the species. The successfully reproduces in Quito Spring and the designated reach San Felipe Creek, Carrizo Wash, Fish Creek Wash. These areas a provide adequate food and cove Perhaps most importantly, these are also isolated or at least parti isolated from predatory and com exotic fishes. Because the desert is non-migratory, the areas it inh must fulfill all the requisites for and successful reproduction.

Section 4(b)(8) requires, for an proposed or final regulation that designates critical habitat, a brie description and evaluation of th activities (public or private) whi adversely modify such habitat o be affected by such designation. should be emphasized that critic habitat designation may not affe of the activities listed below, as habitat designation affects only agencies through section 7 of the

1. Withdrawal of water either or indirectly from San Sebastian could destroy or reduce the suit this habitat for desert pupfish.

2. Stocking of additional exoti other non-endemic species into within the critical habitat, or int through which such fish may gai to the critical habitat, may intro parasites and increase the incid predation on desert pupfish.

3. Other activities (which, tho anticipated at this time, could conceivably occur in the foresee future) could also reduce the hal suitability for desert pupfish. Th activities include geothermal development, oil or gas develop stream channelization, intensive

recreational use, and the siting of transmission lines, roads, canals, or irrigation drains within the designated areas.

Section 4(b)(2) of the Act requires the Service to consider economic and other impacts of designating a particular area as critical habitat. The Service has considered the critical habitat designation in light of relevant additional information obtained and concludes that no significant economic or other impacts are expected to result from the critical habitat designation. The designation of critical habitat is apparently compatible with NPS conservation objectives for Organ Pipe Cactus National Monument. Some geothermal and oil and gas leases have been issued by BLM within or in the vicinity of the critical habitat area in California. BLM, however, has informed the Service that it does not expect that geothermal or oil and gas exploration and development will occur in the foreseeable future. BLM's current management of the portion of critical habitat within the San Sebastian Marsh/San Felipe Creek ACEC and interagency land exchange efforts in progress since 1980 are also apparently compatible with the critical habitat designation. In addition, there is no known involvement of Federal funds or permits for the private land included in the critical habitat designation. For these reasons, no adjustments to the boundaries of the proposed critical habitat were warranted.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. Such actions are initiated by the Service following listing. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402 and are now under revision (see proposal at 48 FR 29990; June 29, 1983). Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. Federal activities that may affect the desert pupfish and its habitat in the future were previously discussed in the "Critical Habitat" section of this rule.

The Act and its implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take, import or export, ship in interstate commerce in the course of a commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that had been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. In some instances, permits may be issued during a specified period of time to relieve undue economic hardship that would be suffered if such relief were not available.

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined by the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

Regulatory Flexibility Act and Executive Order 12291

The Department of the Interior has determined that designation of critical habitat for this species will not constitute a major action under Executive Order 12291 and certifies that this designation will not have a significant economic effect on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*).

Land use in the critical habitat is currently limited to recreation, scientific research, and oil and gas leasing. The public lands adjacent to the critical habitat were recently leased for geothermal exploration. The potential for geothermal or oil and gas development in the area is considered to be low in view of the negative results obtained from nearby test wells. The management objectives of NPS and BLM, for those portions of critical habitat within Organ Pipe Cactus National Monument and the San Sebastian Marsh/San Felipe Creek ACEC, respectively, are compatible with the designation of critical habitat. There is also no known involvement of Federal funds or permits for the private land included as critical habitat. No other Federal activities are presently known or anticipated that would adversely affect or be adversely affected by the critical habitat designation. Therefore, no significant economic or other impacts are expected to result from the critical habitat designation for the desert pupfish. In addition, no direct costs, enforcement costs, or information collection or recordkeeping requirements are imposed on small entities by this designation. These determinations are based on a Determination of Effects that is available at the Regional Office, U.S. Fish and Wildlife Service, 500 N.E. Multnomah Street, Suite 1692, Portland, Oregon 97232.

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Authors

The primary authors of this rule are Mr. Edward M. Lorentzen and Dr. Kathleen E. Franzreb, Sacramento Endangered Species Office, U.S. Fish and Wildlife Service, 2800 Cottage Way, Room E–1823, Sacramento, California 95825 (916/484–4935 or FTS 468–4935).

List of Subjects in 50 CFR Part 17

Endangered and threatened wildlife, Fish, Marine mammals, Plants (agriculture).

Regulations Promulgation

PART 17—[AMENDED]

Accordingly, Part 17, Subchapter B of Chapter I, Title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation for Part 17 continues to read as follows:

Authority: Pub. L. 93–205, 87 Stat. 884; Pub. L. 94–359, 90 Stat. 911; Pub. L. 95–632, 92 Stat. 3751; Pub. L. 96–159, 93 Stat. 1225; Pub. L. 97–304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*).

2. Amend § 17.11(h) by adding the following, in alphabetical order under "FISHES," to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
FISHES							
Pupfish, desert	*Cyprinodon macularius*	U.S.A. (AZ, CA) Mexico	Entire	E	222	17.95(e)	NA

3. Amend § 17.95(e) by adding critical habitat for the desert pupfish as follows: The positions of this entry under § 17.95(e) will follow the same sequence as the species occurs in 17.11.

§ 17.95 Critical habitat—fish and wildlife.

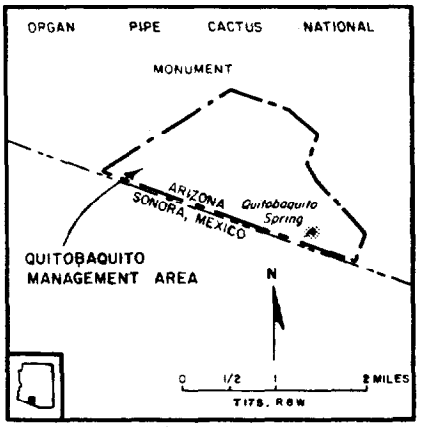
(e) * * *

* * * * * *

Desert Pupfish (*Cyprinodon macularius*)

Arizona: Pima County.

1. *Quitobaquito Spring*, approximately 25 miles WNW Lukeville, Arizona in Organ Pipe Cactus National Monument, in T17S R8N; and a 100-foot riparian buffer zone around the spring.

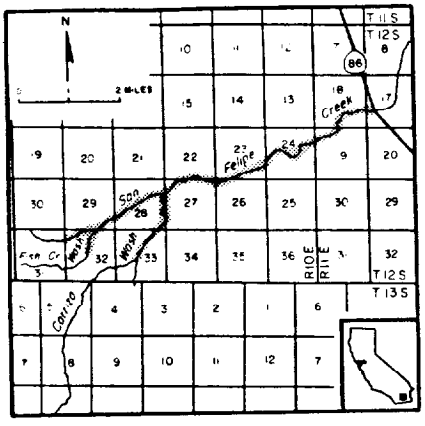


California: Imperial County.

1. *San Felipe Creek.* Approximately 8½ stream miles and 100 feet on either side of San Felipe Creek or the stream channel commencing at the State Highway 86 bridge crossing (approximately ¼ mile south of intersection of Hwy. 78 and Hwy. 86) upstream to the eastern boundary of Section 31, T12S; R10E; including those areas of the stream channel in: T12S; R11E; Section 17, 18, and 19; T12S; R10E; Section 22, 23, 24, 26, 27, 28, 29, and 32.

2. *Carrizo Wash.* Approximately 1¾ stream miles and 100 feet on either side of or the stream channel commencing at the confluence of Carrizo Wash with San Felipe Creek upstream to the southern boundary of N½ Section 33; T12S; R10E; including those areas of the stream channel in T12S; R10E; Section 27, 28, and N½ Section 33.

3. *Fish Creek Wash.* Approximately three-fourths of one stream mile and 100 feet on either side of the stream channel from the confluence of Fish Creek Wash with San Felipe Creek upstream to the southern boundary of N½ Section 32; T12S; R10E; including those areas of the stream channel in T12S; R10E; Section 29 and N½ Section 32.



Constituent elements for all four areas designated as critical habitat include clean unpolluted water that is relatively free of exotic organisms, especially exotic fishes, in small slow-moving desert streams and spring pools with marshy backwater areas.

* * * * *

Dated: February 28, 1986.

P. Daniel Smith,

Deputy Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 86-6980 Filed 3-28-86; 8:45 am]

BILLING CODE 4310-55-M